

Arizona Basin Outlook Report February 15, 2004



Basin Outlook Reports and Federal - State - Private Cooperative Snow Surveys

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How forecasts are made

Most of the annual streamflow in the western United States originates as snowfall that has accumulated in the mountains during the winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Measurements of snow water equivalent at selected manual snow courses and automated SNOTEL sites, along with precipitation and streamflow values are used in computerized statistical and simulation models to prepare runoff forecasts. These forecasts are coordinated between hydrologists in the Natural Resources Conservation Service and the National Weather Service. Unless otherwise specified, all forecasts are for flows that would occur naturally without any upstream influences.

Forecasts of any kind, of course, are not perfect. Streamflow forecast uncertainty arises from three primary sources: (1) uncertain knowledge of future weather conditions, (2) uncertainty in the forecasting procedure, and (3) errors in the data. The forecast, therefore, must be interpreted not as a single value but rather as a range of values with specific probabilities of occurrence. The middle of the range is expressed by the 50% exceedance probability forecast, for which there is a 50% chance that the actual flow will be above, and a 50% chance that the actual flow will be below, this value. To describe the expected range around this 50% value, four other forecasts are provided, two smaller values (90% and 70% exceedance probability) and two larger values (30%, and 10% exceedance probability). For example, there is a 90% chance that the actual flow will be more than the 90% exceedance probability forecast. The others can be interpreted similarly.

The wider the spread among these values, the more uncertain the forecast. As the season progresses, forecasts become more accurate, primarily because a greater portion of the future weather conditions become known; this is reflected by a narrowing of the range around the 50% exceedance probability forecast. Users should take this uncertainty into consideration when making operational decisions by selecting forecasts corresponding to the level of risk they are willing to assume about the amount of water to be expected. If users anticipate receiving a lesser supply of water, or if they wish to increase their chances of having an adequate supply of water for their operations, they may want to base their decisions on the 90% or 70% exceedance probability forecasts, or something in between. On the other hand, if users are concerned about receiving too much water (for example, threat of flooding), they may want to base their decisions on the 30% or 10% exceedance probability forecasts, or something in between. Regardless of the forecast value users choose for operations, they should be prepared to deal with either more or less water. (Users should remember that even if the 90% exceedance probability forecast is used, there is still a 10% chance of receiving less than this amount.) By using the exceedance probability information, users can easily determine the chances of receiving more or less water.

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Issued by

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ARIZONA

Water Supply Outlook Report as of February 15, 2004

A full range of Snow Survey and Water Supply Forecasting products is available on the Arizona NRCS Home Page:

Snow Survey Program

<http://www.az.nrcs.usda.gov/snow/index.html>

Helpful Internet Sites

Defending Against Drought – NRCS

<http://www.nrcs.usda.gov/feature/highlights/drought.html>

- Ideas on water, land, and crop management for you to consider while creating your drought plan.

Arizona Agri-Weekly

<http://www.nass.usda.gov/az/cur-agwk.pdf>

- Provides an overview of Arizona's crop, livestock, range and pasture conditions as reported by local staffs of the USDA's Agricultural Statistic Service and University of Arizona's College of Agriculture.

SUMMARY

Measurements show that snow levels in the Salt, Verde, Little Colorado, and the San Francisco-Upper Gila River Basins remain well below the 30-yr. average for February 15. Snow samples taken in the Chuska Mountains, at the Grand Canyon, and along the central Mogollon Rim also confirm poor snow accumulations for this time of year. As a result, farmers, ranchers, and other growers can expect short water supplies this season.

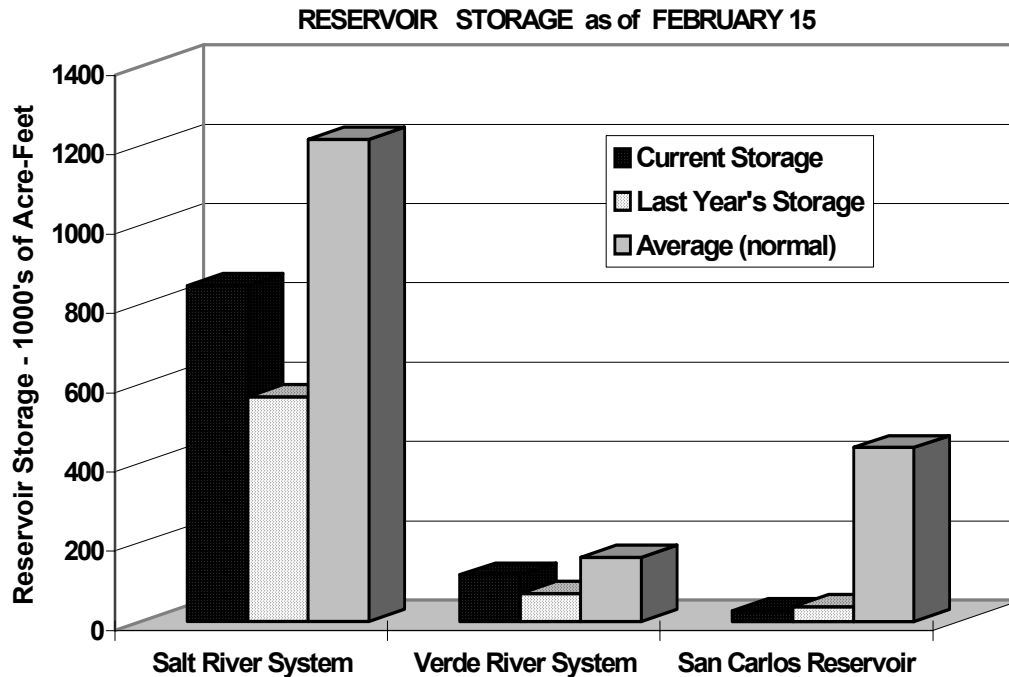
SNOWPACK

Watershed	Percent (%) of 30-Yr. Average
	Snowpack Levels as of February 15
Salt River Basin	72%
Verde River Basin	56%
Little Colorado River Basin	59%
San Francisco-Upper Gila River Basin	67%
Other Points of Interest	
Chuska Mountains	81%
Central Mogollon Rim	56%
Grand Canyon	73%
San Francisco Peaks	68%
Statewide Snowpack	67%

PRECIPITATION

Precipitation amounts were light for the period February 1-15. In that regard, precipitation catch for the month of February will be illustrated in the next report.

RESERVOIR



Key storage volumes displayed in thousands of acre-feet (1000 x):

RESERVOIR	CURRENT STORAGE	LAST YEAR STORAGE	30-YEAR AVERAGE
-----	-----	-----	-----
Salt River System	846.9	566.0	1216.3
Verde River System	116.7	70.5	161.9
San Carlos Reservoir	27.3	36.5	438.3
Lyman Lake	2.2	2.3	14.8
Show Low Lake	3.2	2.1	2.9
Lake Pleasant	609.3	521.9	----
Lake Havasu	538.8	547.4	553.6
Lake Mohave	1622.3	1744.5	1685.2
Lake Mead	15429.0	16888.0	22072.0
Lake Powell	10743.0	13024.0	18448.0

STREAMFLOW

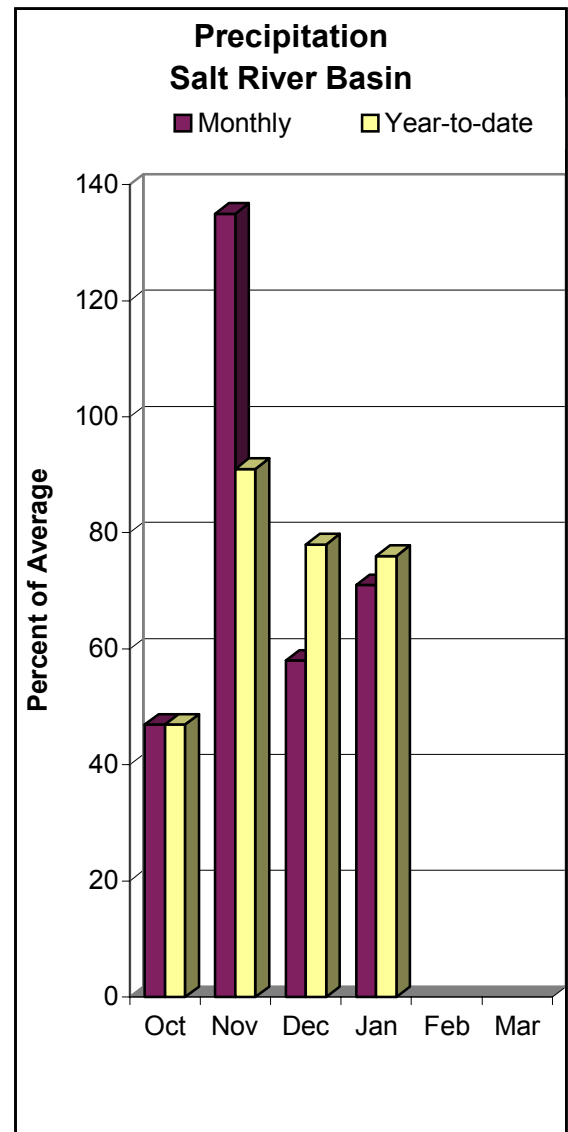
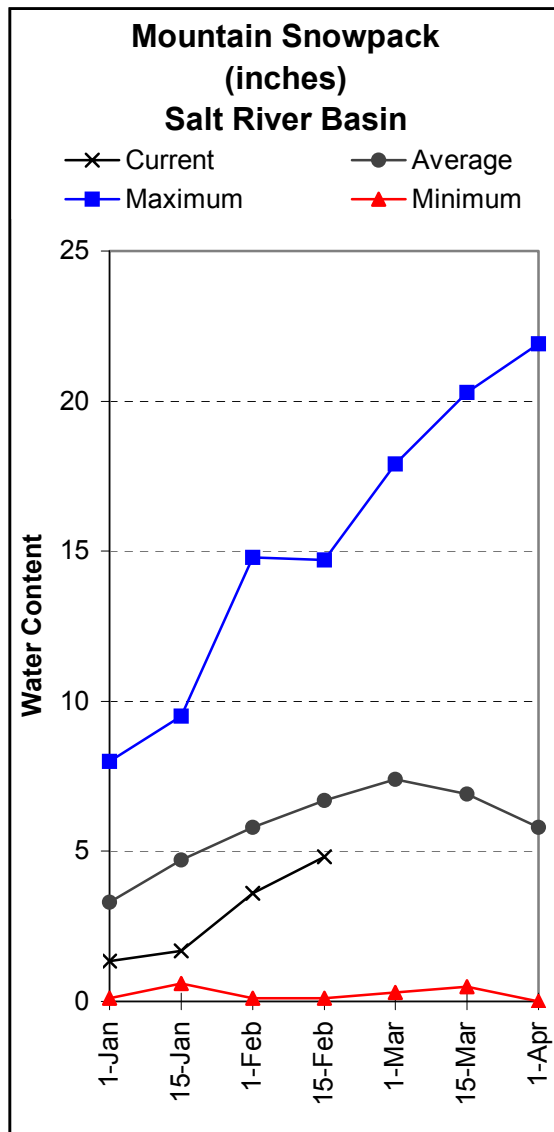
Well below normal runoff is predicted for key river basins. Please refer to the streamflow forecast tables found in this report for more information.



SALT RIVER BASIN as of February 15, 2004

Well below median streamflow levels are forecast for the basin. In the Salt River, near Roosevelt, the forecast calls for 48 % of median streamflow levels through MAY, while at Tonto Creek, the forecast calls for 28 % of median streamflow levels through MAY.

Snow survey measurements show the Salt snowpack to be 72 % of the 30-year average, while combined reservoir storage in the Salt River system is reported at 846,946 acre-feet.



SALT RIVER BASIN
Streamflow Forecasts - February 15, 2004

	<=== Drier === Future Conditions === Wetter ===>						
Forecast Pt	Chance of Exceeding *						
Forecast	90%	70%	50% (Most Prob)	30%	10%		30 Yr Med
Period	(1000AF)	(1000AF)	(1000AF) (% MED.)	(1000AF)	(1000AF)		(1000AF)
Salt River nr Roosevelt							
FEB15-MAY	60	107	150	48	204	303	315
FEBRUARY	8.1	15.1	21	46	28	40	46
Tonto Creek ab Gun Creek nr Roosevelt							
FEB15-MAY	0.5	3.4	8.0	28	15.5	33	29
FEBRUARY	0.1	0.4	1.4	11	4.4	11.9	12.6

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average and median are computed for the 1971-2000 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural volume - actual volume may be affected by upstream water management.

SALT RIVER BASIN
Reservoir Storage (1000AF) Mid-February

Reservoir	Usable Capacity	***** This Year	Usable Storage Last Year	***** Average
SALT RIVER RES SYSTEM	2025.8	846.9	566.0	1216.3

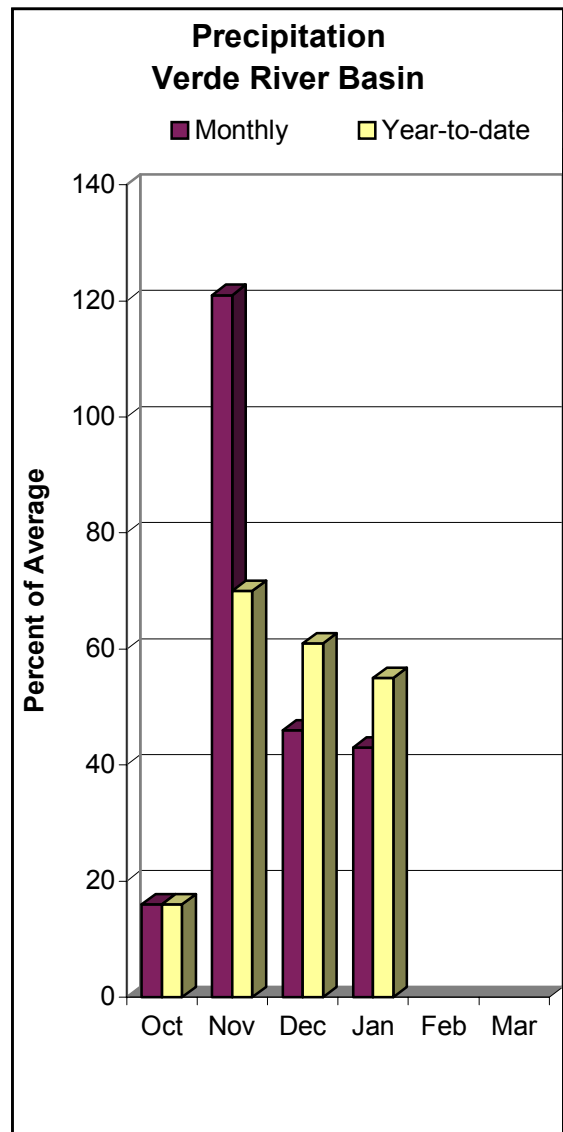
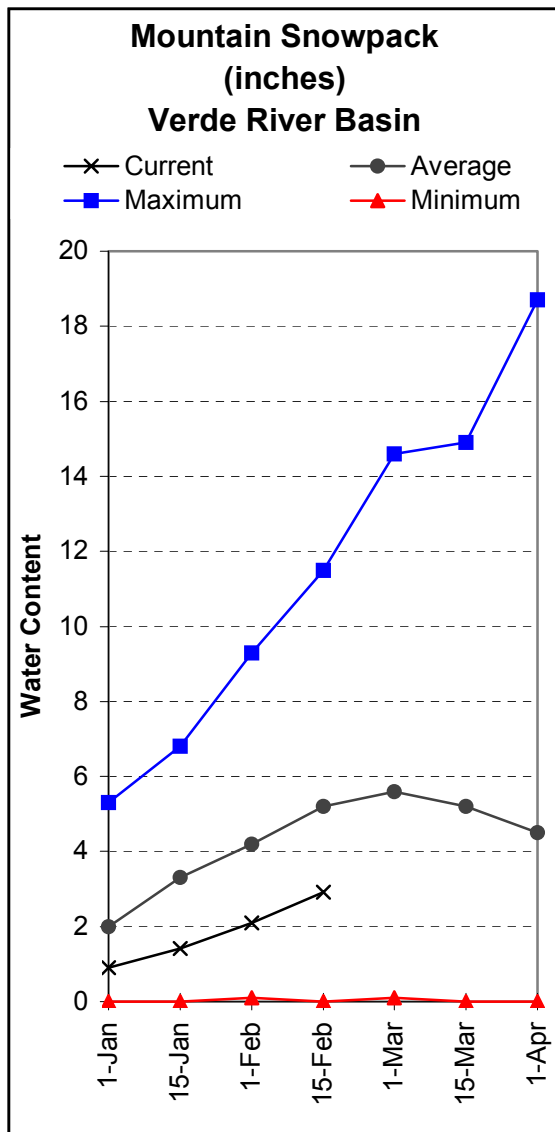
SALT RIVER BASIN
Watershed Snowpack Analysis - February 15, 2004

Watershed	Number of Data Sites	This Year as Percent of Last Year	Average
SALT RIVER BASIN	8	163	72

VERDE RIVER BASIN as of February 15, 2004

Well below median streamflow levels are forecast for the basin. In the Verde River, at Horseshoe Dam, the forecast calls for 42 % of median streamflow levels through MAY.

Snow survey measurements show the Verde snowpack to be 56 % of the 30-year average, while combined reservoir storage in the Verde River system is reported at 116,724 acre-feet.



VERDE RIVER BASIN
Streamflow Forecasts - February 15, 2004

	<=== Drier === Future Conditions === Wetter ===>					
Forecast Pt	Chance of Exceeding *					
Forecast	90%	70%	50% (Most Prob)	30%	10%	30 Yr Med
Period	(1000AF)	(1000AF)	(1000AF) (% MED.)	(1000AF)	(1000AF)	(1000AF)
Verde River abv Horseshoe Dam						
FEB15-MAY	20	45	70	42	103	168
FEBRUARY	7.3	12.3	16.7	48	22	32

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average and median are computed for the 1971-2000 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural volume - actual volume may be affected by upstream water management.

VERDE RIVER BASIN
Reservoir Storage (1000AF) Mid-February

Reservoir	Usable Capacity	***** This Year	***** Usable Storage Last Year	***** Average
VERDE RIVER RES SYSTEM	287.4	116.7	70.5	161.9

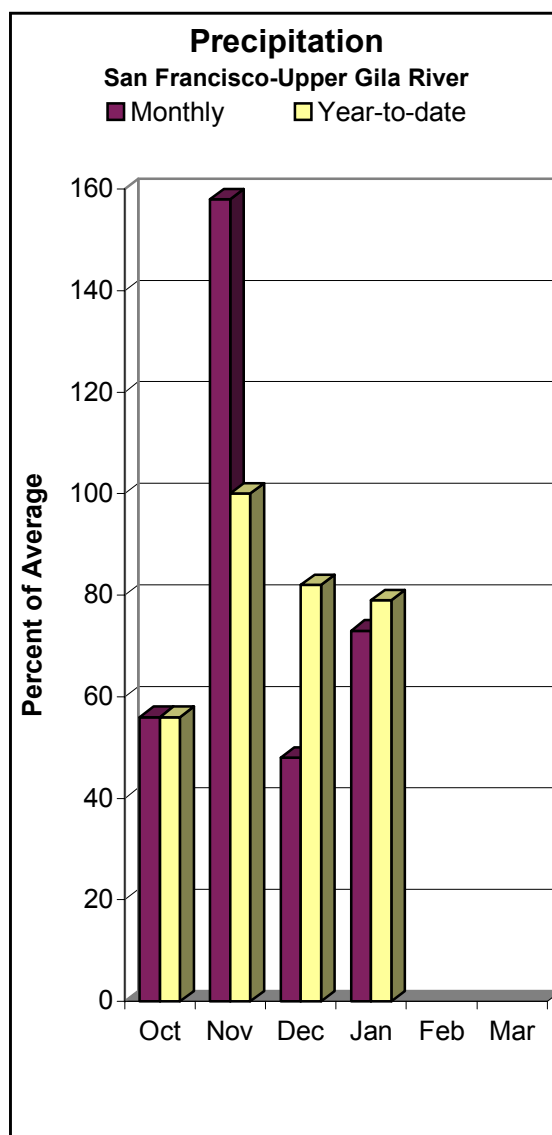
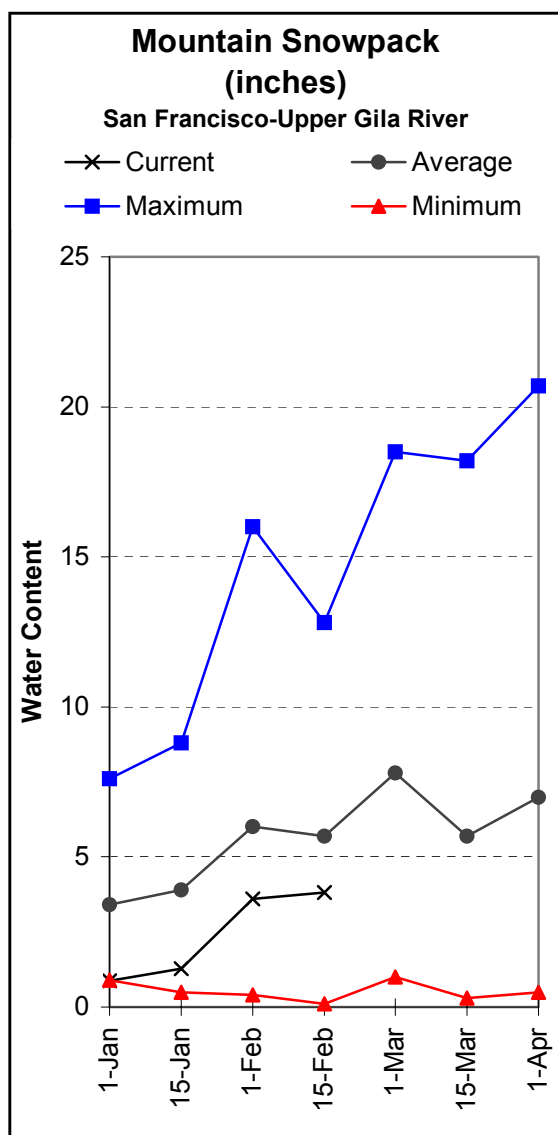
VERDE RIVER BASIN
Watershed Snowpack Analysis - February 15, 2004

Watershed	Number of Data Sites	This Year as Percent of Last Year	Percent of Average
VERDE RIVER BASIN	10	351	56
SAN FRANCISCO PEAKS	3	80	68

SAN FRANCISCO-UPPER GILA RIVER BASIN as of February 15, 2004

Well below median streamflow levels are forecast for the basin. In the San Francisco River, at Clifton, the forecast calls for 33 % of median streamflow levels through MAY, while in the Gila River, near Solomon, the forecast calls for 29 % of median streamflow levels through MAY. At San Carlos Reservoir, inflow into the lake is forecast at 20 % of median through MAY.

At San Carlos, reservoir storage stands at 27,312 acre-feet, while snow survey measurements show the snowpack to be 67 % of the 30-year average.



SAN FRANCISCO - UPPER GILA RIVER BASIN
Streamflow Forecasts - February 15, 2004

	<=== Drier === Future Conditions === Wetter ===>						
Forecast Pt	Chance of Exceeding *						
Forecast	90%	70%	50% (Most Prob)	30%	10%		30 Yr Med
Period	(1000AF)	(1000AF)	(1000AF) (% MED.)	(1000AF)	(1000AF)		(1000AF)
Gila River at Gila							
FEB15-MAY	5.4	10.9	16.3	36	23	37	45
Gila River nr Virden							
FEB15-MAY	0.7	4.7	16.1	24	37	66	66
San Francisco River at Glenwood							
FEB15-MAY	1.5	3.9	6.7	31	10.5	18.4	22
San Francisco River at Clifton							
FEB15-MAY	0.5	5.3	17.5	33	39	71	53
Gila River nr Solomon							
FEB15-MAY	1.0	12.0	35	29	86	160	122
FEBRUARY			12.0	50			24
San Carlos Reservoir inflow							
FEB15-MAY	3.9	7.9	15.6	20	47	93	79

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- (2) - The value is natural volume - actual volume may be affected by upstream water management.

SAN FRANCISCO - UPPER GILA RIVER BASIN
Reservoir Storage (1000AF) Mid-February

Reservoir	Usable Capacity	***** This Year	***** Usable Storage Last Year	***** Average
SAN CARLOS	875.0	27.3	36.5	438.3
PAINTED ROCK DAM	2492.0	0.0	0.0	166.0

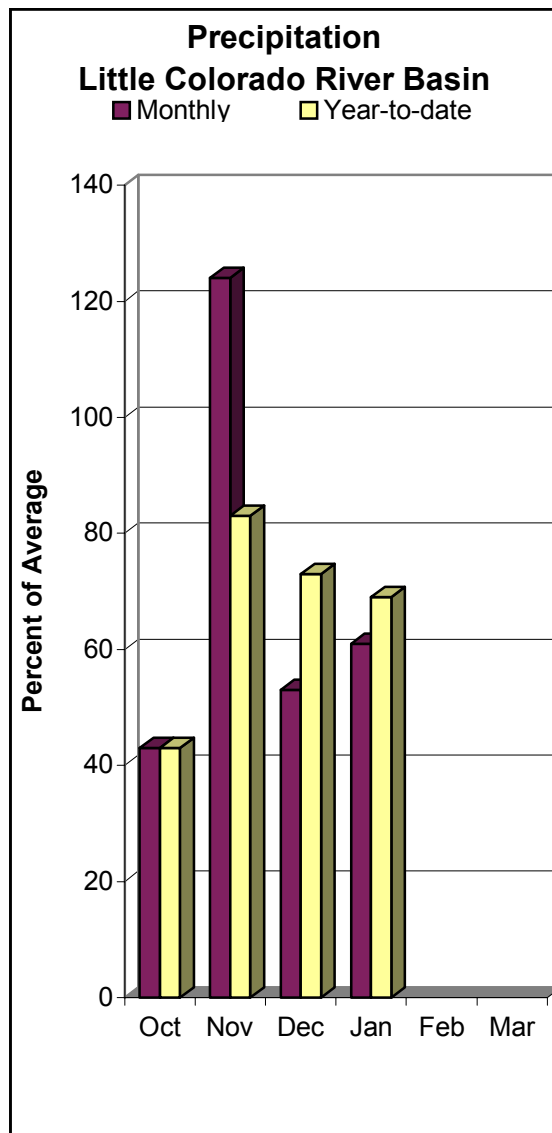
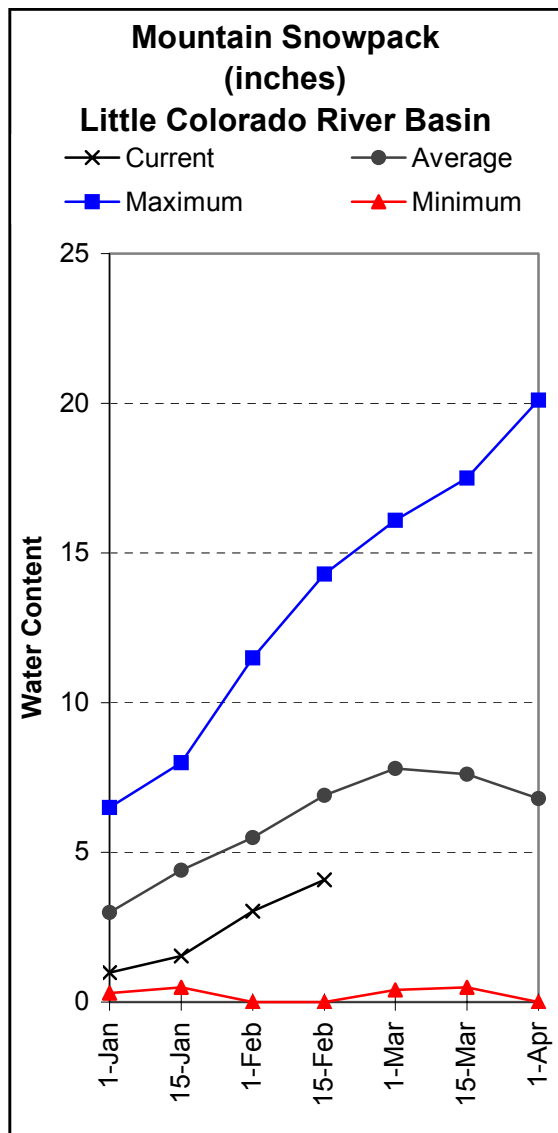
SAN FRANCISCO - UPPER GILA RIVER BASIN
Watershed Snowpack Analysis - February 15, 2004

Watershed	Number of Data Sites	This Year as Percent of Last Year	Percent of Average
SAN FRANCISCO - UPPER GILA R	9	150	67

LITTLE COLORADO RIVER BASIN as of February 15, 2004

Well below median streamflow levels are forecast for the basin. In the Little Colorado River, at Lyman Lake, the forecast calls for 35 % of median streamflow levels through JUNE, while at Woodruff, the forecast calls for 31 % of median streamflow levels through MAY.

Snowpack levels along the southern headwaters of the Little Colorado River, and along the central Mogollon Rim, was measured at 59 % and 56 % of the 30-year average, respectively.



LITTLE COLORADO RIVER BASIN
Streamflow Forecasts - February 15, 2004

	<=== Drier === Future Conditions === Wetter ===>						
Forecast Pt	Chance of Exceeding *						
Forecast	90%	70%	50% (Most Prob)	30%	10%		30 Yr Med
Period	(1000AF)	(1000AF)	(1000AF) (% MED.)	(1000AF)	(1000AF)		(1000AF)
Little Colorado River abv Lyman Lake							
FEB-JUN	0.55	1.48	2.50	35	3.90	6.79	7.10
Little Colorado River at Woodruff							
FEB-MAY	0.08	0.28	0.86	31	2.58	5.06	2.80
Blue Ridge Reservoir inflow							
FEB-MAY	1.9	3.7	5.3	33	7.2	10.5	16.3
Lake Mary inflow							
FEB-MAY	0.41	0.94	1.48	31	2.19	3.62	4.80

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LITTLE COLORADO RIVER BASIN
Reservoir Storage (1000AF) Mid-February

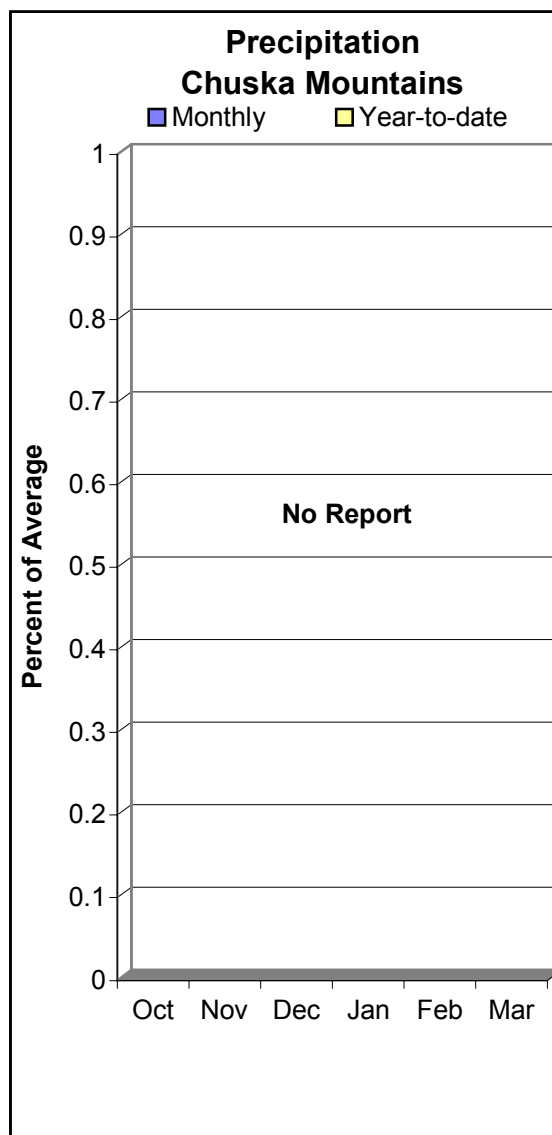
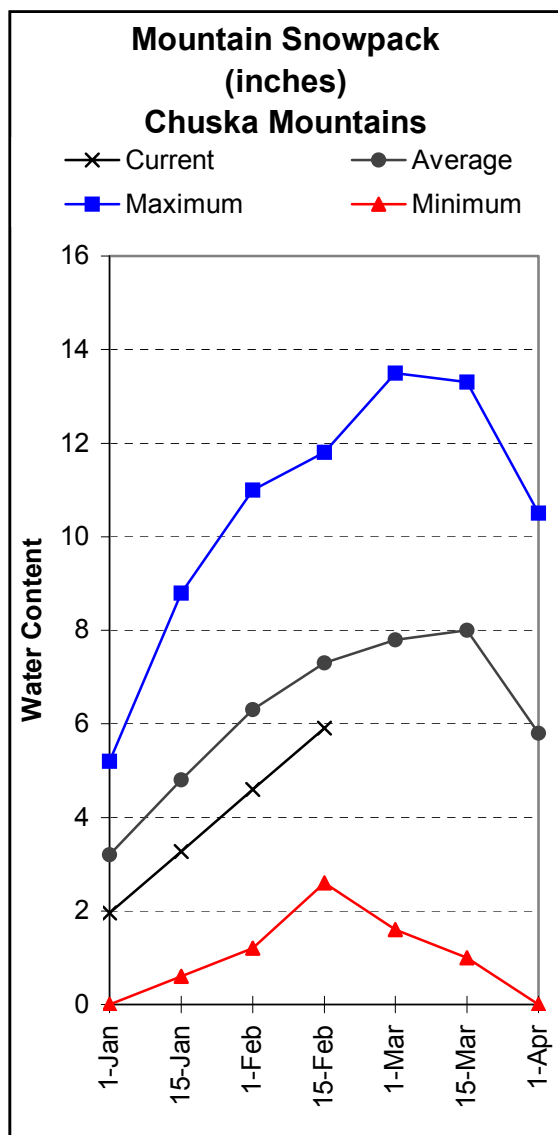
Reservoir	Usable Capacity	***** This Year	Usable Storage Last Year	***** Average
LYMAN RESERVOIR	30.0	2.2	2.3	14.8
SHOW LOW LAKE	5.1	3.2	2.1	2.9

LITTLE COLORADO RIVER BASIN
Watershed Snowpack Analysis - February 15, 2004

Watershed	Number of Data Sites	This Year as Percent of Last Year	Average
LITTLE COLORADO - SOUTHERN H	9	171	59
CENTRAL MOGOLLON RIM	4	251	56

CHUSKA MOUNTAINS as of February 15, 2004

Snow survey measurements conducted by staff of the Navajo Tribe show the Chuska snowpack to be 81 % of average, while well below average streamflow levels are forecast for Captain Tom Wash, Wheatfields Creek, and Bowl Canyon Creek this season.



CHUSKA MOUNTAINS
Streamflow Forecasts - February 15, 2004

	<=== Drier === Future Conditions === Wetter ===>						
Forecast Pt	Chance of Exceeding *						
Forecast	90%	70%	50% (Most Prob)	30%	10%		30 Yr Avg
Period	(1000AF)	(1000AF)	(1000AF) (% AVG.)	(1000AF)	(1000AF)		(1000AF)
Captain Tom Wash nr Two Gray Hills							
MAR-MAY	0.42	0.85	1.75	62	3.05	4.95	2.83
Wheatfields Creek nr Wheatfields							
MAR-MAY	0.44	0.73	1.85	64	3.15	5.15	2.90
Bowl Canyon Creek abv Assayi Lake							
MAR-MAY	0.15	0.24	0.70	70	1.16	1.86	1.00

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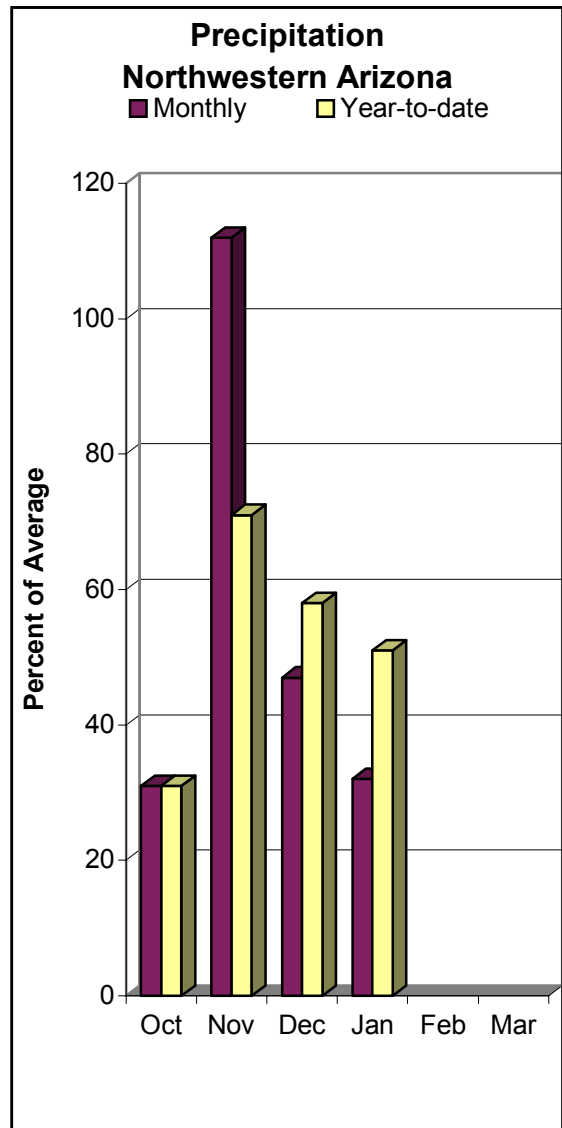
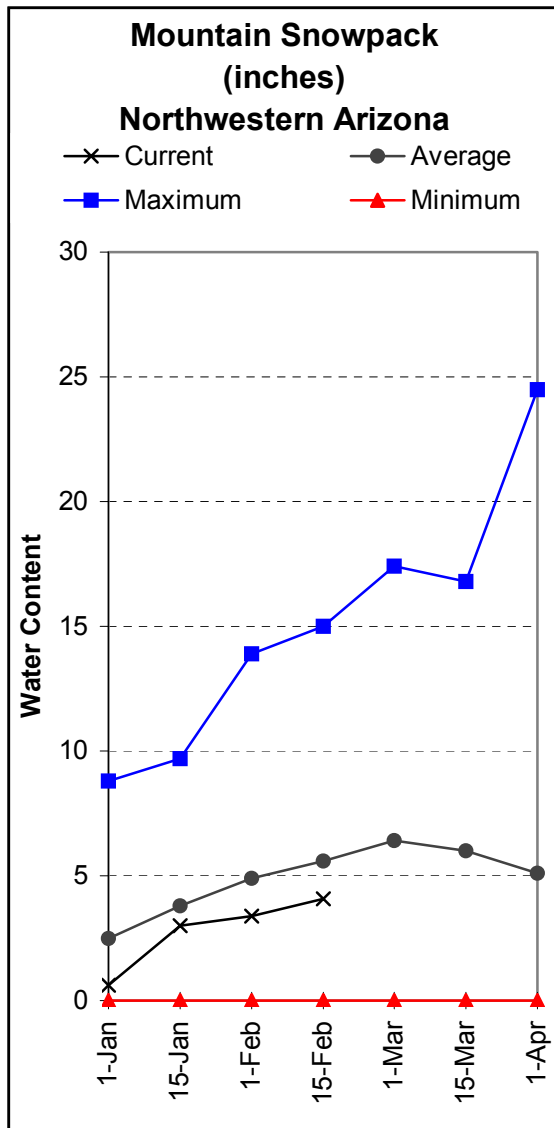
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CHUSKA MOUNTAINS
Watershed Snowpack Analysis - February 15, 2004

Watershed	Number of Data Sites	This Year as Percent of Last Year	Average
CHUSKA MOUNTAINS	7	185	81
DEFIANCE PLATEAU	2	0	85

NORTHWESTERN ARIZONA as of February 15, 2004

Inflow into Lake Powell, on the Colorado River, is forecast to be 76 % of average through JULY, while at the Grand Canyon, snow measurements conducted by staff from the National Park Service show the snowpack to be 73 % of average.



NORTHWESTERN ARIZONA
Streamflow Forecasts - February 15, 2004

	<=== Drier === Future Conditions === Wetter ===>					
Forecast Pt	Chance of Exceeding *					
Forecast	90%	70%	50% (Most Prob)	30%	10%	30 Yr Avg
Period	(1000AF)	(1000AF)	(1000AF) (% AVG.)	(1000AF)	(1000AF)	(1000AF)
Lake Powell inflow						
APR-JUL	3495	4987	6000	76	7009	8509 7930

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The average is computed for the 1971-2000 base period.

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- (2) - The value is natural volume - actual volume may be affected by upstream water management.

NORTHWESTERN ARIZONA
Reservoir Storage (1000AF) Mid-February

Reservoir	Usable Capacity	***** This Year	***** Usable Storage Last Year	***** Average
LAKE HAVASU	619.0	538.8	547.4	553.6
LAKE MOHAVE	1810.0	1622.3	1744.5	1685.2
LAKE MEAD	26159.0	15429.0	16888.0	22072.0
LAKE POWELL	24322.0	10743.0	13024.0	18448.0

NORTHWESTERN ARIZONA
Watershed Snowpack Analysis - February 15, 2004

Watershed	Number of Data Sites	This Year as Percent of Last Year	Percent of Average
GRAND CANYON	2	315	73

S N O W S U R V E Y D A T A

FEBRUARY 15, 2004

SNOW COURSE	ELEV.	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 71-00
ARBABS FOREST (AK)	7680	2/12	9	2.0	.0	2.7
BAKER BUTTE SNOTEL	7330	2/15	-	3.1	0.0	5.7
BAKER BUTTE #2	7700	2/12	17	4.6	2.7	10.7
BALDY SNOTEL	9220	2/15	-	4.9	5.6	7.0
BEAR PAW	10100				-	-
BEAVER HEAD	8000	2/13	12	2.2	0.0	2.9
BEAVER HEAD SNOTEL	7990	2/15	-	2.5	2.8	3.3
BEAVER SPRING	9220	2/11	29	6.7	3.6	8.7
BRIGHT ANGEL	8400	2/12	23	6.6	2.6	8.7
BUCK SPRING	7400	2/12	7	1.6	0.0	4.3
CHALENDER	7100	2/13	3	0.3	0.0	3.1
CHEESE SPRINGS	8600	2/10	17	3.2	2.9	5.0
CORONADO TRL SNOTEL	8400	2/15	-	2.7	0.4	3.4
CORONADO TRAIL	8400	2/13	8	1.9	0.0	2.9
FLUTED ROCK	7800	2/12	15	3.2	0.0	3.4
FORT APACHE	9160	2/10	23	4.8	4.5	6.8
FORT VALLEY	7350	2/11	4	1.1	0.0	2.7
FRY SNOTEL	7220	2/15	-	4.1	1.6	7.0
GRAND CANYON	7500	2/12	8	1.6	0.0	2.6
HANNAGAN MDWS SNOTEL	9020	2/15	-	7.4	5.6	10.2
HAPPY JACK	7630	2/11	11	1.6	0.0	4.8
HAPPY JACK SNOTEL	7630	2/15	-	4.0	2.2	4.6
HEBER SNOTEL	7640	2/15	-	4.1	0.1	5.5
LAKE MARY	6970	2/12	8	1.8	0.0	3.2
MAVERICK FORK SNOTEL	9200	2/15	-	5.4	6.0	8.3
MORMON MTN SNOTEL	7500	2/15	-	4.2	0.3	6.2
MORMON MT. SUMMIT #2	8470	2/12	24	6.1	3.3	10.8
NEWMAN PARK	6750	2/11	10	2.9	0.0	3.0
NUTRIOSO	8500	2/13	5	0.7	0.0	1.7
PROMONTORY SNOTEL	7900	2/15	-	7.0	4.7	11.5
SNOW BOWL #1 ALT.	10260	2/12	23	4.8	12.4	10.6
SNOW BOWL #2	11000	2/12	36	8.0	5.2	14.6
SNOWSLIDE CANYON	9750				-	-
SNOWSLIDE CYN SNTL	9750	2/15	-	11.3	12.4	10.0
TSAILE CANYON #1	8160	2/10	25	5.7	2.7	6.4
TSAILE CANYON #3	8920	2/10	33	7.8	5.1	8.5
WHITE HORSE SNOTEL	7180	2/15	-	1.4	0.0	5.1
WILDCAT SNOTEL	7850	2/15	-	2.7	0.5	4.1
WILLIAMS SKI RUN	7720	2/12	16	4.4	1.6	7.8
WORKMAN CREEK SNOTEL	6900	2/15	-	6.3	0.7	5.9